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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/630,289	BRAUDAWAY, GORDON WESLEY	
	Examiner	Art Unit	
	Neil R. McLean	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 May 2009.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 and 21-29 is/are rejected.

7)☒ Claim(s) 11-20 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal Brief filed on 11/26/2007, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved the reopening of prosecution by signing below:

Status of Claims

2. Claims 1-29 are pending in this application.

Response to Arguments

3. Applicant's arguments, see Appeal Brief filed 5/29/2009, with respect to the rejection(s) of claim(s) 1-29 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Itoh (US 6,810,156).

4. Regarding Applicant's Argument: (Appeal Brief: page 10, lines 13-17)

"Appellant submits that *Horiguchi, Szeleski* and *Davidson* each fail to disclose or suggest a process of creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images. The Examiner asserts that Davidson discloses this feature at col. 5, ll.42-51. See Final Office Action at Page 9, ll.4-11."

Examiner's Response:

Horiguchi and Szeliski do not disclose expressly creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images.

Itoh discloses creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images (Specifically, according to conventionally well-know methods, between every two lines of the original image, <u>an interpolated line is added</u> that is produced either by using the lines of the original image immediately above or below this interpolated line intact, or by calculating the average value between the lines of the original image immediately above and below this interpolated line; Column 1, lines).

Horiguchi, Szeliski & Itoh are combinable because they are from the same field of endeavor of image processing; e.g., all references disclose methods of comparing embedded image patterns. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to create an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images. The suggestion/motivation for doing so is to improve the quality of an image that undergoes a change of resolution. It is well known in the art that when e.g., the resolution of an image is increased that some lines may appear to be craggy and that pixels can be missing from the enlarged resolution resulting in a deterioration of quality between the first set of image patterns and the second set of image patterns.

Therefore, it would have been obvious to combine Horiguchi and Szeliski's methods of comparing before and after versions of picture elements and ascertaining the differences with Itoh's method for image interpolation to obtain the invention as specified to improve the rendering of a scanned image.

Claim Objections

5. Claim 26 is objected to because of the following informalities: Claim 26 depends from Method Claim 23. Claim 26 states **'A system, as in claim 23'**. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horiguchi et al. (US 4,561,103) hereafter Horiguchi, in view of Szeliski et al. (US 6,993,156) hereafter Szeliski, and further in view of Itoh (US 6,810,156).

Regarding Claim 1:

Horiguchi discloses a system for detecting errors in a printed copy (See Print Inspecting Method According to a Digitization System diagram in Figure 1), the system comprising:

one or more computer memories (14/15/16 in Figure 3) having one or more digitized (Column 3, lines 67-68; see A/D Converter in Figure 1) source images (P in Figure 1);

one or more scanners (1 in Figure 1) that scan one or more printed copies to create one or more corresponding scanned images (See Reference Data Memory M in Figure 1 where these images are stored);

an alignment process (The program code or device which performs the function described in Flow Chart in Figure 28) that creates an initial replacement image from the scanned image, the replacement scanned image (See Inspection Data I in Figure 1)

being aligned (Column 4, lines 32-40) with the digitized source image (See Reference Data Memory M in Figure 1) on a page by page (A_{11} to A_{mn} in Figure 8), line by line (See A_{11} to A_{m1} in Figure 8), and pel by pel (See A_{ij} in Figure 8); and

a comparison process (The program code or device which performs the function described in Column 4, lines 40-44) that compares (See Comparison and Decision Operation in Figure 17) one or more source pels of the digitized source image with one or more corresponding scanned pels of the initial replacement image to determine differences (Column 4, lines 45-49; See Comparison Circuit CO in Figure 1), the differences being defects in the printed copies.

Horiguchi does not disclose expressly an alignment process that uses an affine transform to compute points of interest in a scanned image that correspond to each pel location in a digitized source image.

Szeliski discloses an alignment process that uses an affine transform (Figures 6A-6C are graphical images illustrating Szeliski's invention. In particular 6C displays an example of an affine transform as described in Column 13, lines 10-36) to compute points of interest in a scanned image that correspond to each pel location in a digitized source image (The present invention is embodied in a **system and method for statistically analyzing and comparing a first group of pixels** of a defined portion of a digital scene, such as an object or template within the digital scene, **to a second group of pixels**, such as the entire digital scene or the image. The template is matched to appropriately corresponding portions of the image that represent the template. In one embodiment, during statistical comparison and matching of the template and the image, either the first or the second group of pixels is raster transformed. For instance, either the template or the image is incrementally rotated, scaled, or skewed to enhance the statistical analyses as described in Column 5, lines 40-51).

Szeliski & Horiguchi are combinable because they are from the same field of endeavor of image processing; e.g., both references disclose methods of comparing before and after versions of picture elements and ascertaining the differences. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an affine transformation to compute points of interest. Szeliski discloses that applications for automatic digital object detection and tracking, image registration, pattern recognition and computer vision analysis are becoming increasingly important for providing new classes of services to users based on assessments of the object's presence, position, trajectory, etc. These assessments allow advanced and accurate digital analysis (such as pattern recognition, motion analysis, etc.). The suggestion/motivation for doing so would be to compare and match multiple sets of data e.g., to help determine and improve the acceptability of the printing process. It would have been obvious for one of ordinary skill in the art to combine Szeliski's method for comparing and matching plural sets of digital data with Horiguchi's print inspection method to obtain the invention as specified in order to save time and resources.

Horiguchi and Szeliski do not disclose expressly creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images.

Itoh discloses creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images (Specifically, according to conventionally well-know

methods, between every two lines of the original image, <u>an interpolated line is added</u> that is produced either by using the lines of the original image immediately above or below this interpolated line intact, or by calculating the average value between the lines of the original image immediately above and below this interpolated line; Column 1, lines).

Horiguchi, Szeliski & Itoh are combinable because they are from the same field of endeavor of image processing; e.g., all references disclose methods of comparing embedded image patterns. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to create an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images. The suggestion/motivation for doing so is to improve the quality of an image that undergoes a change of resolution. It is well known in the art that when e.g., the resolution of an image is increased that some lines may appear to be craggy and that pixels can be missing from the enlarged resolution resulting in a deterioration of quality between the first set of image patterns and the second set of image patterns.

Therefore, it would have been obvious to combine Horiguchi and Szeliski's methods of comparing before and after versions of picture elements and ascertaining the differences with Itoh's method for image interpolation to obtain the invention as specified to improve the rendering of a scanned image.

8. Claims 2- 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al. (US 7,013,803) hereafter Hansen, in view of Itoh (US 6,810,156).

Regarding Claim 2:

Hansen discloses a system for detecting errors in a printed copy, the system comprising:

one or more computer memories (402/404/406 in Figure 8) having one or more digitized (see CCD signal processor 516 in Figure 9) source images (see image sensor 214 in Figure 2);

a digital printer that converts the digitized source images into one or more printed copies (Column 4, lines 51-52);

one or more scanners (102 in Figure 1) that scan the printed copies to create one or more corresponding scanned images (Column 8, lines 59-62));

an alignment process (The program code or device which performs the function described in Column 7, lines 19-28) creates a replacement image (Printed Color Registration Marks; Column 7, lines 13-16; "the camera assembly 102 locates and measures the relationship of the <u>printed marks</u> of each color relative to each other and relative to the <u>predefined pattern 306</u>") from the scanned image, the replacement image being aligned with the digitized source image (See Predefined Register Mark Pattern 306 in Figure 7) on a page and page (Column 8, lines 59-62), line by line (Column 9, lines 16-19)), and pel by pel basis (Column 9, lines 47-50); and

a comparison process (The program code or device which performs the function described in Column 7, lines 12-18) that compares one or more source pels of the digitized source image with one or more corresponding scanned pels of the

replacement image to determine differences (Column 7, lines 1-5), the differences being defects in the printed copies (Column 7, lines 16-18).

Horiguchi and Szeliski do not disclose expressly creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images.

Itoh discloses creating an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images (Specifically, according to conventionally well-know methods, between every two lines of the original image, <u>an interpolated line is added</u> that is produced either by using the lines of the original image immediately above or below this interpolated line intact, or by calculating the average value between the lines of the original image immediately above and below this interpolated line; Column 1, lines).

Horiguchi, Szeliski & Itoh are combinable because they are from the same field of endeavor of image processing; e.g., all references disclose methods of comparing embedded image patterns. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to create an initial replacement image from a scanned image by performing an interpolation to generate additional lines in the scanned images to correspond to the digitized source images. The suggestion/motivation for doing so is to improve the quality of an image that undergoes a change of resolution. It is well known in the art that when e.g., the resolution of an image is increased that some lines may appear to be craggy and that pixels can be missing from the enlarged resolution resulting in a deterioration of quality between the first set of image patterns and the second set of image patterns.

Therefore, it would have been obvious to combine Horiguchi and Szeliski's methods of comparing before and after versions of picture elements and ascertaining the differences with Itoh's method for image interpolation to obtain the invention as specified to improve the rendering of a scanned image.

Regarding Claim 3:

Horiguchi further discloses the system, as in claim 2, where the alignment process comprises a course-alignment and a subsequent fine alignment (The program code or device which performs the iterative process described in Column 7, lines 19-28).

Regarding Claim 4:

Horiguchi further discloses the system, as in claim 3, where the course alignment produces an initial replacement image and the fine alignment produces a final replacement image being the replacement image (The software code or device which performs the iterative process described in Column 7, lines 19-28).

Regarding Claim 5:

Horiguchi further discloses the system, as in claim 3, where the course alignment is a repeated application of an affine transform of source image pels and the fine alignment is a repeated application of a one dimensional cross-correlation of one or more course aligned pels to source pels (The software code or device which performs

the iterative process described in Column 7, lines 19-28).

Regarding Claim 6:

Horiguchi further discloses the system, as in claim 2, where the alignment process comprises the steps of:

embedding two or more vertical synchronization-strips into the digitized source image (Column 6, lines 62-67; See 300/302/304 in Figure 6; 306 in Figure 7);

printing the synchronization-strips on the printed copy (Column 7, lines 5-8);

scanning the printed copy so that two or more scanned vertical synchronization-strips are embedded in the scan copy, the vertical synchronization-strips being separated by a first separation distance (Column 7, lines 12-18);

tracking the horizontal and vertical coordinates of one or more sequential and specifically identifiable features in lines of the synchronization-strip to create a line by line correspondence (The program code or device which performs the function described in Column 7, lines 1-5) between the source image and the corresponding scanned image;

performing a scanned image pixel value interpolation based on an affine transform, comprising the following steps:

sub dividing (Column 7, line 19; 'sampling') the source image and scanned image into one or more source and scanned horizontal strips, respectively;

determining at least two corresponding points on two corresponding lines in the source and scanned images, the two corresponding lines separated by a second

separation distance (The program code or device which performs the function described in Column 7, lines 1-8);

using at least four of the corresponding points, two at a time from each of the lines to develop a transformation of the coordinates of pels in the source image to points of interest in the scanned image (Column 11, lines 51-57);

determining an interpolated pixel value of the scanned image at the point of interest (Column 12, lines 5-6); and

for each pixel, placing the interpolated pixel value into an initial replacement image at the pel coordinates corresponding to the pel of the source image used to determine the point of interest (Column 12, lines 6-10).

Regarding Claim 7:

Horiguchi further discloses the system, as in claim 6, where the alignment process further comprises the steps of:

dividing the source image into a plurality of initial source horizontal strips (Column 7, line 19; 'sampling');

dividing one of the source horizontal strips into a plurality of source vertical stripes (The program code or device which performs the function in Column 13, lines 4-9);

dividing the initial aligned image into a plurality of initial aligned horizontal strips (The program code or device which performs the function in Column 13, lines 4-9);

dividing one of the aligned horizontal strips into a plurality of initial vertical stripes (The program code or device which performs the function in Column 13, lines 4-9);

dividing the initial horizontal strip corresponding to the respective source horizontal strips into a plurality of initial vertical stripes (The program code or device which performs the function in Column 13, lines 4-9), the source vertical stripes and the initial vertical strips corresponding to one another and having the same height and width (The program code or device which performs the function described in column 7, lines 1-5);

determining three or more cross-correlation values between the source and initial vertical stripes for an initial horizontal alignment and two or more horizontal offsets between the source and initial vertical stripes (Column 7, lines 12-18);

using the three or more cross-correlation values and their corresponding offsets to further determine an interpolated offset that produce the optimal correlation value (Column 12, lines 5-10);

producing an interpolated offset for each pair of source and initial vertical stripes (Column 12, lines 5-10);

performing a piece-wise interpolation between the interpolated offsets to develop a fine alignment that is dependent on the horizontal pel position of the source image (The software code or device which performs the iterative process described in Column 7, lines 19-28);

and re-performing the scanned image pixel value interpolation wherein a horizontal coordinate of the pel of the source image is increased by the piece-wise

interpolated value of the fine alignment (The software code or device which performs the iterative process described in Column 7, lines 19-28).

Regarding Claim 8:

Horiguchi further discloses the system, as in claim 2, where the comparison process uses masks (Column 12, lines 17-18).

Regarding Claim 9:

Horiguchi further discloses the system, as in claim 8, where the mask is a dilation mask (Column 12, lines 17-18).

Regarding Claim 10:

Horiguchi further discloses the system, as in claim 8, where the mask is an erosion mask (Column 12, lines 17-18).

Regarding Claim 21:

Horiguchi further discloses the system, as in claim 2, where the scanner has a line array sensor (Column 6, lines 31-33);

Regarding Claim 22:

Horiguchi further discloses the system, as in claim 21, where the line array sensor is compensated so that all pixels that sense only black ink printed on paper

produce the same black numeric value and that all pixels that sense blank paper produce the same white numeric value (Column 9, lines 6-10).

9. Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al. (US 7,013,803) hereafter Hansen, in view of Davidson et al. (US 6,952,485) hereinafter ‘Davidson’.

Regarding Claim 23:

Hansen discloses a method for aligning content on a printed page, the method comprising the steps of:

embedding two or more synchronization-strips into a digitized source image to form a marked source image to locate lines in a first stream of the digitized source image with a second stream of the digitized source image (Column 6, lines 62-67; See 300/302/304 in Figure 6; 306 in Figure 7); and

printing the marked source image to form a printed copy (Column 7, lines 5-8), the embedded synchronization-strips containing line identification of one or more lines of the printed copy (Column 9, lines 16-19).

Hansen does not disclose expressly a process of embedding synchronization-strips that have a counter pattern at defined intervals' to provide a unique page count.

Davidson discloses a process of embedding synchronization-strips that have a counter pattern at defined intervals' to provide a unique page count (The watermark encoder

can be used to embed tracer data in an image as it is being printed or transferred. The forensic tracer data may include: data identifying the date of an activity from a clock in the imaging device or host computer of the driver, data identifying the serial number of a computer system, data identifying a serial number of a system component, data identifying a user of the computer system, data identifying a file, data indicating the nature of a detected event, data indicating the status of the computer system, data from a registry database, data relating to an external network connection, and data derived from a digital watermark payload; Column 9, lines 45-56). Note: The Examiner perceives that descriptive information about the attributes or elements of the data could include a page number and that Davidson's above list is not inclusive.

Hansen & Davidson are combinable because they are from the same field of endeavor of image processing; e.g., both references disclose methods of comparing embedded image patterns. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embed an image pattern on each page to identify every page such. The suggestion/motivation for doing so would be to encode user information as a document is being printed. This user information may be used for counterfeit deterrence by embedding tracer information such as a page number in the document that will help identify the maker of the counterfeit document. Another application is to associate other forms of metadata about the document as it is being printed such as page or document number by embedding the metadata or a reference to the metadata in a watermark as disclosed by Davidson in the summary of invention.

Therefore, it would have been obvious to combine Hansen's methods of comparing before and after versions of picture elements and ascertaining the differences with Davidson's method for encoding the page number and decoding to obtain the invention as specified to discontinue the unauthorized image scan of a high value document, such as a bank note, identify document, ticket, check, etc.

Regarding Claim 24:

Hansen further discloses the method, as in claim 23, further comprising the steps of:

scanning the printed copy so that two or more scanned vertical synchronization-strips are embedded in a scanned image, the vertical synchronization-strips being separated by a first separation distance (Column 7, lines 12-18); and

tracking the horizontal and vertical coordinates of one or more sequential and specifically identifiable features in the synchronization-strip to create a line by line correspondence (The program code or device which performs the function described in Column 7, lines 1-5) between the marked source image and the corresponding scanned image.

Regarding Claim 25:

Hansen further discloses the method, as in claim 24, further comprising the steps of:

performing a scanned image pixel value interpolation based on an affine transform, the affine transform comprising the following steps:

sub dividing the source image and scanned image into one or more source and scanned horizontal strips (Column 7, line 19; 'sampling'), respectively;

determining by synchronization-strip tracking at least two corresponding points on two corresponding lines in the source and scanned images, the two corresponding

lines separated by a second separation distance (The program code or device which performs the function described in Column 7, lines 1-8);

using at least four of the corresponding points, two at a time from each of the lines to develop a transformation of the coordinates of pels in the source image to points of interest in the scanned image (Column 11, lines 51-57);

determining an interpolated pixel value of the scanned image at the point of interest (Column 12, lines 5-6); and

for each pixel, placing the interpolated pixel value into an initial replacement image at the pel coordinates corresponding to the pel of the source image used to determine the point of interest (Column 12, lines 6-10).

Regarding Claim 26:

Hansen further discloses the method, as in claim 23, where the alignment process further comprises the steps of:

dividing the source image into a plurality of initial source horizontal strips (Column 7, line 19; 'sampling');

dividing one of the source horizontal strips into a plurality of source vertical stripes (The program code or device which performs the function in Column 13, lines 4-9);

dividing the initial aligned image into a plurality of initial aligned horizontal strips (The program code or device which performs the function in Column 13, lines 4-9);

dividing one of the aligned horizontal strips into a plurality of initial vertical stripes (The program code or device which performs the function in Column 13, lines 4-9);

dividing the initial horizontal strip corresponding to the respective source horizontal strips into a plurality of initial vertical stripes (The program code or device which performs the function in Column 13, lines 4-9), the source vertical stripes and the initial vertical strips corresponding to one another and having the same height and width (The program code or device which performs the function described in column 7, lines 1-5);

determining three or more cross-correlation values between the source and initial vertical stripes for an initial horizontal alignment and two or more horizontal offsets between the source and initial vertical stripes (Column 7, lines 12-18);

using the three or more cross-correlation values and their corresponding offsets to further determine an interpolated offset that produce the optimal correlation value (Column 12, lines 5-10);

producing an interpolated offset for each pair of source and initial vertical stripes (Column 12, lines 5-10);

performing a piece-wise interpolation between the interpolated offsets to develop a fine alignment that is dependent on the horizontal pel position of the source image (The software code or device which performs the iterative process described in Column 7, lines 19-28);

and re-performing the scanned image pixel value interpolation wherein a horizontal coordinate of the pel of the source image is increased by the piece-wise

interpolated value of the fine alignment (The software code or device which performs the iterative process described in Column 7, lines 19-28).

Regarding Claim 27:

Hansen discloses a system for aligning content on a printed page, the system comprising:

means for embedding two or more synchronization-strips into a digitized source image to produce a marked source image to locate lines in a first stream of the digitized source image with a second stream of the digitized source image (The software code or device which performs the function described in Column 6, lines 62-67), the synchronization-strips having a counter pattern at defined intervals to provide a unique page count; and

means for printing the marked source image containing the synchronization-strips on a printed copy, the synchronization-strips containing line identification of one or more lines of the printed copy (The program code or device which performs the Column 9, lines 16-19).

Hansen does not disclose expressly a process of embedding synchronization-strips that have a counter pattern at defined intervals' to provide a unique page count.

Davidson discloses a process of embedding synchronization-strips that have a counter pattern at defined intervals' to provide a unique page count (The watermark encoder can be used to embed tracer data in an image as it is being printed or transferred. The forensic tracer data may include: data identifying the date of an activity from a clock in the imaging device or host computer of the driver, data

identifying the serial number of a computer system, data identifying a serial number of a system component, data identifying a user of the computer system, data identifying a file, data indicating the nature of a detected event, data indicating the status of the computer system, data from a registry database, data relating to an external network connection, and data derived from a digital watermark payload; Column 9, lines 45-56). Note: The Examiner perceives that descriptive information about the attributes or elements of the data could include a page number and that Davidson's above list is not inclusive.

Hansen & Davidson are combinable because they are from the same field of endeavor of image processing; e.g., both references disclose methods of comparing embedded image patterns. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embed an image pattern on each page to identify every page such. The suggestion/motivation for doing so would be to encode user information as a document is being printed. This user information may be used for counterfeit deterrence by embedding tracer information such as a page number in the document that will help identify the maker of the counterfeit document. Another application is to associate other forms of metadata about the document as it is being printed such as page or document number by embedding the metadata or a reference to the metadata in a watermark as disclosed by Davidson in the summary of invention.

Therefore, it would have been obvious to combine Hansen's methods of comparing before and after versions of picture elements and ascertaining the differences with Davidson's method for encoding the page number and decoding to obtain the invention as specified to discontinue the unauthorized image scan of a high value document, such as a bank note, identify document, ticket, check, etc.

Regarding Claim 28:

Hansen discloses a system for aligning content in a printed copy, the system comprising:

one or more scanners (Column 4, lines 56-57 and 102 in Figure 1) that scan one or more printed copies to create one or more corresponding digitized (Column 8, lines 42-49; see 516 in Figure 9) scanned images;

an alignment process (Column 6, lines 45-51 and see Transport System 104 in Figure 1) that embeds two or more synchronization-strips into a digitized source image to produce a marked source image to locate lines in a first stream of the digitized source image with a second stream of the digitized source image; and

printer that prints the marked source image with the embedded synchronization-strips in a sacrificial portion of a page (In typical color registration control systems, each printing unit of a printing press prints at least one registration mark of a predetermined size and shape on a predetermined portion of the web, typically along its edge; Column 2, line 65 – Column 3, line 1) to form the printed copy, the synchronization-strips containing line identification of one or more lines of the printed copy (Column 9, lines 16-19).

Regarding Claim 29:

Hansen discloses a system, as in claim 28, wherein the sacrificial portion of a page includes any one or more of the following locations:

in a vertical gutter between pages printed on a web segment and in a vertical sacrificial part of the web segment (In typical color registration control systems, each printing unit of a

printing press prints at least one registration mark of a predetermined size and shape on a predetermined portion of the web, typically along its edge; Column 2, line 65 – Column 3, line 1).

Note: It is inherent that register/registration marks are commonly used with printing to help ensure that print is aligned properly, and that these marks are on that portion of the web/page surface such as margins or unused or indiscriminate portions of print.

Allowable Subject Matter

10. Claims 11-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is an examiner's statement of reasons for allowance:

Claims 11-20 are allowable over the prior art of record because non of the prior art of record teaches or fairly suggests a system for detecting errors in a printed copy that dilates the source image, erodes the replacement image and bit-wise or's the corresponding one-bit pel values of the dilated source image and the eroded replacement image to produce a first intermediate result, and wherein bit-wise exclusive-or'ing the first intermediate result with the one-bit pel values of the dilated source image to indicate the pel locations of excess ink in the scanned image.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neil R. McLean whose telephone number is (571)270-1679. The examiner can normally be reached on Monday through Friday 7:30AM-4:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571.272.7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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